9 process returns to step 302. If flash memory 64 has (or will have) space, step 320 waits for a "space available now" signal before flash spooler 1 (86), in step 322, copies the raw image data from RAM disk 74 to flash memory 64 and then deletes the file on RAM disk 74. Step 324 transfers control to IPC 88 and returns the FIG. 9 process to step 302 to wait for another message on its input queue 78.

FIG. 10 is a flowchart of preferred method steps for implementing the image processing/compression 88 of the present invention. In step 400, processing unit 54 initializes IPC 88. In step 402, IPC 88 waits for a message on its input queue 78 before advancing to step 404. IPC 88, in step 404, determines whether a "stop processing" request is present. If the request is present, step 406 returns data cell 76 to control application 82 and returns the FIG. 10 process back to step 402. If the request is not present, step 408 determines whether the image data is already compressed. If already compressed, step 422 sends the compressed image data to RAM spooler 2 (90) and returns the FIG. 10 process to step 402.

If the data is not compressed, step 410 determines whether a "delete image" request is present. If the request is present, step 412 deletes the disk file or releases frame buffer 70 to accept incoming raw image data from imaging device 14. Step 406 then sends data cell 76 to control application 82 and returns the FIG. 10 process to step 402. If the "delete image" request is not present, step 414 determines whether there is (or will be) space on RAM disk 74. If there is space, step 416 waits for a "space available now" signal before step 418 creates the file to write on RAM disk 74. If step 414 determines that RAM disk 74 has no space, then step 424 determines whether flash memory 64 has (or will have) space. If flash memory 64 has no space, step 426 creates a RAM 60 buffer to hold the image data. If flash memory 64 has (or will have) space, step 428 waits for a "space available now" signal before step 430 creates the file to write on flash memory 64.

In step 420, IPC 88 processes and compresses the raw image data and writes it to the appropriate destination (RAM disk 74, flash memory 64 or the RAM 60 buffer created in step 426) and then deletes the source file or releases frame buffer 70 to accept new incoming raw image data from imaging device 14. Step 422 transfers control to RAM spooler 2 (90) and returns the FIG. 10 process to step 402 to wait for another message on its input queue 78.

FIG. 11 is a flowchart of preferred method steps for implementing RAM Spooler 2 (90) of the present invention. In step 500, processing unit 54 initializes RAM spooler 2 (90). In step 502, RAM spooler 2 (90) waits for a message on its input queue 78 before advancing to step 504. RAM spooler 2 (90), in step 504, determines whether the compressed image data is in the RAM 60 buffer created in step 426 (FIG. 10). If not, step 522 sends the compressed data to flash spooler 2 (92) and returns the FIG. 11 process to step 502. If so, step 506 determines whether a "stop processing" request is present. If the request is present, step 508 returns data cell 76 to control application 82 and returns the FIG. 11 process back to step 502.

If the "stop processing" request is not present, step 510 determines whether a "delete image" request is present. If the request is present, step 512 releases the RAM 60 buffer. If the "delete image" request is not present, step 514 determines whether there is (or will be) space on RAM disk 74. If there is (or will be) space, step 516 waits for a "space available now" signal before step 518 creates the file to write on RAM disk 74. If step 514 determines that RAM disk 74 has no space, then step 524 determines whether flash memory 64 has (or will have) space. If flash memory 64 has no space, step 526 signals an error, returns data cell 76 to control application 82 and returns the FIG. 11 process to step 502. If flash memory 64 has (or will have) space, step 528 waits for a "space available now" signal before step 530 creates the file to write on flash memory 64.

In step 520, RAM spooler 2 (90) writes the compressed image data to the created file and releases the RAM 60 buffer. Step 522 transfers control to flash spooler 2 (92) and returns the FIG. 11 process to step 502 to wait for another message on its input queue 78.

FIG. 12 is a flowchart of preferred method steps for implementing the flash spooler 2 (92) of the present invention. In step 600, processing unit 54 initializes flash spooler 2 (92). In step 602, flash spooler 2 (90) waits for a message on its input queue 78 before advancing to step 604. Flash spooler 2 (92), in step 604, determines whether flash memory 64 is available. If not available, step 606 returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602. If flash memory 64 is available, step 608 determines whether a "stop processing" request is present. If the request is present, step 606 returns data cell 76 to control application 82 and returns the FIG. 12 process back to step 602.

If the request is not present, step 610 determines whether the compressed image data is stored in flash memory 64. If the data is stored in flash memory 64, step 612 returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602. If the compressed data is not stored in flash memory 64, step 614 determines whether a "delete image" request is present. If the request is present, step 616 deletes the file in RAM disk 74. Step 606 then returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602. If the "delete image" request is not present, step 618 determines whether the compressed image data is stored in RAM disk 74. If the compressed data is not stored in RAM disk 74, step 620 signals an error, returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602. If the compressed image data is stored in RAM disk 74, step 622 determines whether flash memory 64 has (or will have) space. If flash memory 64 has no space, step 620 signals an error, returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602. If flash memory 64 has (or will have) space, step 624 waits for a "space available now" signal before flash spooler 2 (92), in step 626, copies the compressed image data from RAM disk 74 to flash memory 64 and then deletes the file on RAM disk 74. Step 612 then returns data cell 76 to control application 82 and returns the FIG. 12 process to step 602 to wait for another message on its input queue 78.

The present invention has been described above with reference to certain preferred embodiments, however, those skilled in the art will recognize that various modifications may be provided. Furthermore, while the present invention has been discussed above as applied to digital cameras, those skilled in the art will also recognize that the current apparatus and method may also be applied to other devices such as optical scanners and fax machines. These and other variations upon and modifications to the preferred embodiment are provided for by the present invention which is limited only by the following claims.

What is claimed is:

1. A method for increasing a digital camera image capture rate, comprising the steps of:

capturing an image upon detecting an image capture request;

storing the image in a memory device;

repeating the capturing and storing steps if another image capture request is detected;

performing image processing and compression on the image;

halting the image processing/compression step and returning to the capturing step if another image capture request is detected; and

resuming the image processing/compression step after the capturing, storing and repeating steps have been performed.

2. The method of claim 1 further comprising the steps of:

deleting the image before the storing step if an image deletion request is detected; and

deleting the image before the image processing/compression step if the image deletion request is detected.

3. The method of claim 1 wherein:

the image is a raw image;

the capturing step further comprises the step of placing the raw image in a frame buffer;

the memory device is comprised of a first memory device and a second memory device, and

the storing step further comprises the steps of:

(a) skipping to step (e), if the first memory device does not have room for another raw image;

(b) copying the raw image from the frame buffer to the first memory device;

(c) deleting the raw image from the frame buffer;

(d) returning to said capturing step if another raw image capture request is detected;

(e) skipping to the image processing and compression step if the second memory device does not have room for another raw image;

(f) copying the raw image from the first memory device to the second memory device;

(g) halting step (f) and returning to step (a) if the image capture request is detected;

(h) deleting the raw image from the first memory device; and

(i) returning to step (b) if another raw image can be moved from the frame buffer to the first memory device.

4. The method of claim 3, wherein the image processing and compression step further comprises the steps of:

processing the raw image from the frame buffer if the raw image is located in the frame buffer;

processing the raw image from the first memory device if the raw image is located in the first memory device;

processing the raw image from the second memory device if the raw image is located in the second memory device;

halting the image processing and compression step and returning to said capturing step if the image capture request is detected;

halting the image processing and compression step and returning to step (b) if at least one more raw image can be copied from the frame buffer to the first memory device;

halting the image processing and compression step and returning to step (f) if at least one more raw image can be copied from the first memory device to the second memory device; and

storing a compressed image in a memory device.

5. The method of claim 4 wherein the first memory device is a RAM disk and the second memory device is a removable flash memory.

6. An apparatus for increasing a digital camera image capture rate, comprising:

means for capturing an image upon detecting an image capture request;

means for storing the image in a memory device;

means for repeating the capturing and storing if another image capture request is detected;

means for performing image processing and compression on the image;

means for halting the image processing and compression means and returning to the capturing means if another image capture request is detected; and

means for resuming the image processing and compression means after the capturing, storing and repeating means have been performed.

7. The apparatus of claim 6 further comprising:

means for deleting the image before the storing means if an image deletion request is detected; and

means for deleting the image before the image processing and compression means if the image deletion request is detected.

8. The apparatus of claim 6 wherein:

the image is a raw image;

the means for capturing further comprises means for placing the raw image in a frame buffer;

the memory device is comprised of a first memory device and a second memory device, and

the storing means further comprises:

(a) means for skipping to means (e) if the first memory device does not have room for another raw image;

(b) means for copying the raw image from the frame buffer to the first memory device;

(c) means for deleting the raw image from the frame buffer;

(d) means for returning to means for capturing if another raw image capture request is detected;

(e) means for skipping to the image processing and compression means if the second memory device does not have room for another raw image;

(f) means for copying the raw image from the first memory device to the second memory device;

(g) means for halting means (f) and returning to means (a) if the image capture request is detected;

(h) means for deleting the raw image from the first memory device; and

(i) means for returning to means (b) if another raw image can be moved from the frame buffer to the first memory device.

9. The apparatus of claim 8, wherein the image processing and compression means further comprises:

means for processing the raw image from the frame buffer if the raw image is located in the frame buffer;

means for processing the raw image from the first memory device if the raw image is located in the first memory device;

means for processing the raw image from the second memory device if the raw image is located in the second memory device;

means for halting the image processing and compression means and returning to the means for capturing if the image capture request is detected;

means for halting the image processing and compression means and returning to means (b) if at least one more raw image can be copied from the frame buffer to the first memory device;

means for halting the image processing and compression means and returning to means (f) if at least one more raw image can be copied from the first memory device to the second memory device; and

means for storing a compressed image in a memory device.

10. The apparatus of claim **9** wherein the first memory device is a RAM disk and the second memory device is a removable flash memory.

11. A computer readable medium comprising program instructions for:

capturing an image upon detecting an image capture request;

storing the image in a memory device;

repeating the capturing and storing steps if another image capture request is detected;

performing image processing and compression on the image;

halting the image processing and compression step and returning to the capturing step if another image capture request is detected; and

resuming the image processing and compression step after the capturing, storing and repeating steps have been performed.

12. The medium of claim **11** further comprising instructions for:

deleting the image before the storing step if an image deletion request is detected; and

deleting the image before the image processing and compression step if the image deletion request is detected.

13. The medium of claim **11** wherein:

the image is a raw image;

the capturing step further comprises the step of placing the raw image in a frame buffer;

the memory device is comprised of a first memory device and a second memory device, and

the storing step further comprises the steps of:

(a) skipping to step (e) if the first memory device does not have room for another raw image;

(b) copying the raw image from the frame buffer to the first memory device;

(c) deleting the raw image from the frame buffer;

(d) returning to said capturing step if another raw image capture request is detected;

(e) skipping to the image processing and compression step if the second memory device does not have room for another raw image;

(f) copying the raw image from the first memory device to the second memory device;

(g) halting step (f) and returning to said capturing step if the image capture request is detected;

(h) deleting the raw image from the first memory device; and

(i) returning to step (b) if another raw image can be moved from the frame buffer to the first memory device.

14. The medium of claim **13** wherein the image processing and compression step further comprises the steps of:

processing the raw image from the frame buffer if the raw image is located in the frame buffer;

processing the raw image from the first memory device if the raw image is located in the first memory device;

processing the raw image from the second memory device if the raw image is located in the second memory device;

halting the image processing and compression step and returning to said capturing step if the image capture request is detected;

halting the image processing and compression step and returning to step (b) if at least one more raw image can be copied from the frame buffer to the first memory device;

halting the image processing and compression step and returning to step (f) if at least one more raw image can be copied from the first memory device to the second memory device; and

storing a compressed image in a memory device.

15. The medium of claim **14** wherein the first memory device is a RAM disk and the second memory device is a removable flash memory.

16. An apparatus for increasing a digital camera capture rate, comprising:

an imaging device for generating raw image data responsive to an image capture request;

a memory buffer for initially storing the raw image data;

first routines for conveying the initially stored raw image data away from the frame buffer to a second memory location to provide space for storing additional, subsequently captured images, wherein the raw image data is stored in uncompressed form in the second memory location;

second routines for processing said raw image data and for storing said processed image data; and

a central processing unit coupled to the imaging device and to the memory buffer, for executing according to a predetermined set of priorities the first and second routines;

wherein the first routines are assigned priority over the second routines to thereby facilitate the rapid conveyance of raw image data away from the frame buffer.

17. The apparatus of claim **16**, wherein the first routines are configured to convey the initially stored raw image data from the frame buffer to a RAM disk.

18. The apparatus of claim **17**, wherein the second routines include:

a routine for transferring raw image data from the RAM disk to a flash memory;

a routine for compressing raw image data;

a routine for storing the compressed image data in the RAM disk; and

a routine for transferring the compressed image data from the RAM disk to the flash memory;

wherein the routine for transferring raw image data from the RAM disk to a flash memory has priority over the routine for compressing raw image data, the routine for compressing raw image data has priority over the routine for storing the compressed image data in the RAM disk, and the routine for storing the compressed image data in the RAM disk has priority over the routine for transferring the compressed image data from the RAM disk to the flash memory.

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